

**LIE-DOWN MASSAGER**

By

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**BACKGROUND OF THE INVENTION**

The invention relates generally to a massaging device. More particularly, the present invention relates to an improved lie-down massager capable of efficiently treating bodily malfunctions such as back pain and  
10 gastrointestinal weakness by applying a therapeutic massaging treatment along the back and neck of a patient lying down on the massager whose massaging bumps move horizontally and vertically along the patient's spinal cord and neck while the vertical movement of the  
15 massaging bumps are actuated by a air cylinder lifting mechanism.

Conventional bed or mat type massaging devices employ a spring mechanism for vertically moving massaging bumps. As disclosed USP 6,454,732, a spring mechanism  
20 allows the massaging bumps to gently move up and down. However, when it comes to therapeutic effects, the spring mechanism proves too soft to push up the massaging bumps when stronger pressure is required, because tension of springs applies equally to patients lying on the  
25 massaging device regardless of patient's requirements.

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A demand is to adopt a reliable mechanism demonstrating a steady and robust therapeutic effects while stabilizing the vertical movement of the massaging bumps.

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#### SUMMARY OF THE INVENTION

The present invention is contrived to overcome the conventional disadvantages. Accordingly, an object of the invention is to provide a lie-down massager that improves  
10 therapeutic effects by adopting an air cylinder lifting mechanism for a vertical movement of massaging bumps. Another object is to stabilize the vertical movement of the massaging bumps, thereby enabling patients to receive a steady and robust massaging of the massaging bumps  
15 applied to and along their backs and necks. A further object is to improve product reliability and customer satisfaction by mechanically stabilizing the vertical movement of the massaging bumps.

To achieve these and other objects, the lie-down  
20 massager according to the present invention includes a base frame having an elongated top panel, through which an elongated top opening is formed centrally and lengthwise, a rider provided below the elongated top panel of the base frame, a guide member movably engaged  
25 between the base frame and the rider so as to enable the

rider to make a horizontally reciprocal movement relative to the base frame, a lifter having a top plate and a bottom plate, a fluid operated cylinder fixed to the bottom plate, and a compressor providing pressurized  
5 fluid to the fluid operated cylinder, and a plurality of massage bumps attached on the top plate of the lifter and moving vertically and/or horizontally along the elongated top opening of the elongated top panel of the base frame, and a pad covering the massage bumps and the elongated  
10 top opening of the base frame. The fluid operated cylinder has a cylinder shaft that is connected to the top plate, and the cylinder shaft moves the top plate up and down.

The lifter further includes a guide shaft fixed  
15 between the cylinder shaft and the top plate, and a guide bearing that guides the guide shaft. The guide bearing is fixed to the bottom plate, and the guide bearing has a guide hole that receives the guide shaft. The guide shaft has a polygonal cross section, and the guide hole has the  
20 same polygonal cross section. Preferably, the guide shaft has a square cross section.

The lifter further includes a tension spring fixed between the top plate and the bottom plate. The fluid operated cylinder overcomes the force exerted by the  
25 tension spring to move the top plate.

The fluid operated cylinder is actuated by pressurized air or by pressurized hydraulic oil.

The massage bumps are partitioned to first and second pairs, and the first pair bumps are aligned  
5 parallel to the second pair bumps. The massage bump includes a heater that is a heating lamp generating heat and infrared rays.

First and second bump holders are provided for propping and maintaining the first and second pair bumps  
10 above the top portion of the lifter. The first and second bump holders are tapered toward each lower end thereof. Also a first engagement member to rockingly engage the lower ends of the bump holders to the top portion of the lifter, and a second engagement member to rollingly  
15 engage the massage bumps thereto are provided. The massage bumps are roller balls that are formed of jade.

Alternatively, the massage bumps are provided as round projections that are fixed to the top upper surface portion of the lifter.

20 The guide member includes one or more roller gear engaged to and powered by a roller gear motor, and one or more side rack gears parallel to each other and provided lengthwise in the base frame. The roller gear motor is fixed to the rider, and the roller gears are rollably

connected to the rider and rotatably mounted on the side rack gears.

Alternatively, the guide member includes rider guide rollers provided on each side of the rider, and a pair of  
5 pulleys linked by a rope and respectively mounted in a front end portion and a rear end portion of the base frame. The rider guide rollers are rollably engaged to the base frame to guide a horizontally reciprocal movement of the rider. A predetermined portion of the  
10 rope is fixedly attached to the rider so that the pulley rotation enables the rider to generate a horizontally reciprocal movement of the rider. The pulleys are relatively twisted by 90 degrees against each other.

The lie-down massager further includes a pair of  
15 roller coasters parallel to each other, and coaster guide rollers formed outwardly extending from each side of the lifter. The roller coasters are attached to the base frame, and each of the roller coasters has a substantially waved top surface. The coaster guide  
20 rollers enable the coasting member to make a roller coasting movement on and along the waved top surfaces of the roller coasters. Each of the waved top surfaces of the roller coasters substantially forms a curvature of a human spinal cord.

The bottom plate of the lifter further includes a plurality of elongated guides extending downward from the bottom portion, and the rider further has a plurality of guide bushes upwardly formed on the rider to releasably  
5 receive the elongated guides so as to stabilize the roller coasting movement of the lifter along the roller coasters. The elongated guides are shaped in pins.

Advantages of the present inventions include that:

- (1) the air cylinder lifting mechanism minimizes parts  
10 required for the vertical movement of the massaging, while improving stability in the vertical reciprocation of the lifter carrying the massaging bumps; (2) the air cylinder lifting mechanism provides smooth and quite operation of the lifter; (3) the air cylinder lifting  
15 mechanism provides cushioning effect when the massage bumps are moved against a body of a patient; (4) the tension spring prevents abrupt lifting of the massage bumps and provides good controllability of the air cylinder operation; (5) the square guide shaft and the  
20 guide bearing provides guiding effect eliminating the need of separate guide members such as guide pins and guide bushes; and (5) the coasting member working with the roller coasters to realize an additional lifting by utilizing the horizontally reciprocal movement of the  
25 rider enables the massaging bumps to continue a smooth,

steady and robust massaging on the patient, thereby substantially improving massaging effect and subsequently maximizing customer satisfaction.

Although the present invention is briefly summarized,  
5 the full understanding of the invention can be obtained by the following drawings, detailed description and appended claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

10 These and other features, aspects and advantages of the present invention will become better understood with reference to the accompanying drawings, wherein:

FIG. 1 is a view showing a lie-down massager with a patient lying thereon according to the present invention;

15 FIG. 2 is a plan view showing the lie-down massager without the patient in FIG. 1;

FIG. 3 is a partial perspective view showing an overall mechanism of the lie-down massager according to a first embodiment of the present invention;

20 FIG. 4 is a partial plan view showing a second embodiment of the present invention;

FIG. 5 is a partial perspective view showing the mechanism according to the second embodiment of the present invention;

FIG. 6 is a partial exploded perspective view showing the rider and the lifter;

FIG. 7 is a perspective view of the lifter;

FIG. 8 is a front elevation view showing that the  
5 lifter is in its highest position;

FIG. 9 is a front elevation view showing that the lifter is in its lowest position;

FIG. 10 is a plan view of the lifter;

FIG. 11 is a cross sectional view taken along the  
10 line 11 - 11 in FIG. 10, showing the operation of the air cylinder lifting mechanism; and

FIG. 12 is a perspective view of the lifter with different massage bumps attached thereon.

15       **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

FIG. 1 shows a brief massaging mechanism of a lie-down massager 10 according to the present invention with a patient lying thereon for a bodily massage, and FIG. 2 shows a plan view of the massager 10 excluding the  
20 patient. As shown therein, the lie-down massager 10 includes a base frame 12 in a bed type or a mat type. The base frame 12 includes an elongated top panel 14, and an elongated opening 16 is formed centrally and lengthwise through the elongated top panel 14. The massager 10  
25 includes a rider 18 and a lifter 20. The rider 18 is



provided below the elongated top panel 14 of the base frame 12.

In order to implement the horizontal reciprocation of the rider 18, there is provided a guide member 26 movably engaged between the base frame 12 and the rider 18 so as to enable the rider 18 to make a horizontally reciprocal movement relative to the base frame 12. Here, it is recommended that the guide member 26 be either a rope-pulley application or a rack gear application.

As shown in FIG. 2 together with FIG. 3, the guide member 26 according to the rope-pulley application includes a rope 28, a pair of pulleys 30 and a pulley motor 32 that controls one of the pulleys 30. The pulleys 30 are linked by the rope 28 and respectively mounted in a front end portion 34 and a rear end portion 36 of the base frame 12. In a preferred version, the pulley motor 32 is provided adjacent to the pulley 30 provided in the rear end portion 36 of the base frame 12. In this construction, a predetermined portion 29 of the rope 28 is fixedly attached to the rider 18 so that the pulley rotation enables the rider 18 to generate a horizontally reciprocal movement of the rider 18. Preferably, the pulleys 30 are relatively twisted by 90 degrees against each other to facilitate the horizontal reciprocation of

the rider 18 while improving controllability of the rider reciprocation.

Meanwhile, FIGS. 4, 5 and 6 respectively illustrate the rack gear application for the horizontal reciprocation of the rider 18. As shown therein, the guide member 26 employing the rack gear application includes a pair of side rack gears 40 parallel to each other and lengthwisely provided in the base frame 12, a roller gear 42 perpendicular to the side rack gears 40, and a roller gear motor 44 fixed to the rider to power the roller gear 42. The roller gear 42 is rollably connected to a rider 46 and rotatably mounted on the side rack gears 40.

To accelerate massaging effect, the massager 10 includes one or more pairs of roller coasters 50 parallel to each other. The roller coasters 50 are attached to the base frame 12 and above the rider guide rollers 52 formed on each side of the rider 18 (refer to FIG. 3). The rider guide rollers 52 are rollably engaged to the base frame 12 to guide a horizontally reciprocal movement of the rider 18. That is, the roller coasters 50 are formed on each side of the base frame 12. Here, the roller coasters 50 each have a substantially waved top surface 54. It is preferred that the waved top surfaces 54 of the roller

coasters 50 each substantially form a curvature of a human spinal cord.

In order to utilize the roller coasters 50, there are provided two coaster guide rollers 90 formed  
5 outwardly extending from each side of the lifter 20. The coaster guide rollers 90 enable the lifter 20 to make a roller coasting movement on and along the waved top surfaces 54 of the roller coasters 50.

As shown in FIGS. 7-12, the lifter 20 has a top  
10 plate 120 and a bottom plate 122, a fluid operated cylinder 200 fixed to the bottom plate 122, and a compressor 202 providing pressurized fluid to the fluid operated cylinder 200. The fluid operated cylinder 200 has a cylinder shaft 204 that is connected to the top  
15 plate 120. The cylinder shaft 204 moves the top plate 120 up and down.

The lifter 20 further includes a guide shaft 206 fixed between the cylinder shaft 204 and the top plate 120, and a guide bearing 208 that guides the guide shaft  
20 206. The guide bearing 208 is fixed to the bottom plate 122. As shown well in FIGS. 10 and 11, the guide bearing 208 has a guide hole 210 that receives the guide shaft 206. The guide shaft 206 has a polygonal cross section, and the guide hole 210 has the same polygonal cross  
25 section. Preferably, the guide shaft 206, and thus the

guide hole 210 have a square cross section. In this way, the lifter 20 does not need separate guide elements that guide the vertical movement of the massage bumps 100, since the square guide shaft 20 and the square guide hole 5 210 allows movement of the top plate 120 only in vertical direction. Rotation of the top plate 120 cannot occur.

The lifter further includes a tension spring 212 fixed between the top plate 120 and the bottom plate 122. The fluid operated cylinder 200 overcomes the force 10 exerted by the tension spring to move the top plate 120. The fluid operated cylinder 200 may be actuated by pressurized air or pressurized hydraulic oil. The tension spring 212 provides biasing effect to the lifting or lowering motion of the lifter 20. Thus, the tension 15 spring 212 prevents abrupt lifting of the top plate 120 by the fluid operated cylinder 200, and facilitates precise movement of the top plate 120. The top plate 120 is moved by the force by the fluid operated cylinder 200 minus the force by the tension spring 212.

20 Referring FIG. 11, the fluid operated cylinder 200 has a chamber 214 into which pressurized fluid is supplied from the compressor 202 via an inlet tube 216, and the fluid is exhausted via an outlet tube 218. A piston 220 is reciprocated in the chamber 214 by changing 25 the pressure applied by the pressurized fluid. The

cylinder shaft 204 is fixed to the piston 220. The tension spring 212 is fixed to the top plate 120 and the bottom plate 122 with a screw 222 and a bracket 224 that presses the ends of the tension spring 212 to the top  
5 plate 120 or the bottom plate 122. The guide shaft 206 is fixed on top of the cylinder shaft 204. The guide shaft 206 is connected to the top plate 120 via a flange 226.

Elongated guides 62 downwardly extend from the bottom plate 122 of the lifter 20, and guide bushes 64  
10 are upwardly formed on the rider 18 to releasably receive the elongated guides 62 so as to stabilize the roller coasting movement of the lifter 20 along the roller coasters 50. Preferably, the elongated guides 62 are shaped in pins.

15 Two side coasting walls 156 extend downward from two opposing ends of the bottom plate 122, and the coaster guide rollers 90 are rotatably attached to the side coasting walls 156.

In order to finally apply the air cylinder lifting  
20 mechanism to a patient lying on the massager 10, there are provided massage bumps 100 attached on the top plate 120 of the lifter 20 and moving vertically and/or horizontally along the elongated top opening 16 of the elongated top panel 14 of the base frame 12. Optionally,

a pad 17 may be provided to cover the massage bumps 100 and the elongated top opening 16 of the base frame 12.

FIG. 8 shows that the top plate 120 is in its uppermost position, that is, the massage bumps 100 are in their topmost position. FIG. 9 shows that the top plate 120 is in its lowermost position, that is, the massage bumps 100 are in their lowermost position.

As is shown well in FIG. 7, the massage bumps 100 are preferably partitioned to first and second pairs 102, 104. Here, the first pair bumps 102 are aligned parallel to the second pair bumps 104. The massage bumps 100 each include a heater 106 which can be a heating lamp generating heat and infrared rays.

To further improve massaging effect, there are provided first and second bump holders 108, 110 propping and maintaining the first and second pair bumps 102, 104 above the top plate 120 of the lifter 20. For a better massaging result, the first and second bump holders 108, 110 are tapered toward a lower end 109 thereof, and a first engagement member 112 to rockingly engage the lower ends 109 of the bump holders 108, 110 to the top plate 120 of the lifter 20, and a second engagement member 116 to rollingly engage the massage bumps 100 thereto, are provided. The massage bumps 100 may be roller balls formed of precious stone such as jade.

FIG. 12 shows alternate massage bumps 98. The massage bumps 98 are round projections that are fixed on the top plate 120 of the lifter 20.

Although the invention has been described in  
5 considerable detail, other versions are possible by converting the aforementioned construction. Therefore, the scope of the invention shall not be limited by the specification specified above.